Bureau of Waste Management
Curtis State Office Building
1000 SW Jackson, Suite 320
Topeka, KS 66612-1366

Robert Moser, MD, Secretary.

Kansas
Department of Health & Environment

phone: 785-296-1600
fax: 785-296-1592
email: bwmweb@kdheks.gov
www.kdheks.gov/waste

Sam Brownback, Governor

March 15, 2012

Brenda B. Epperson
Environmental Manager
Valero Energy Corporation
P.O. Box 696000
San Antonio, TX 78269-6000

RE: Comments on the Exposure Unit Supplemental Soil Investigation Report
MRP Properties Company, LLC
Former Total Petroleum, Inc. Refinery
1400 South M Street, Arkansas City, Kansas
RCRA ID# KSD087418695

Dear Ms. Epperson,

The Kansas Department of Health and Environment (KDHE) and the Environmental Protection Agency (EPA) Region 7 have reviewed the Exposure Unit Supplemental Soil Investigation (SSI) report dated April 25, 2011, submitted by MWH Americas, Inc. on behalf of MRP Properties Company, LLC (MRP). This report was submitted to summarize the results of the Exposure Unit Supplemental Soil Investigation (SSI) at the former Total Petroleum, Inc. Refinery site, located in Arkansas City. The soil investigation delineated areas, such as the Process Area (PA), Junk Storage Area (JSA), Construction Debris Landfill (CDL), within the refinery that are impacted by contaminated soils which require corrective action. KDHE and EPA have the following comments:

KDHE COMMENTS

1. Section 2.1.2 and Section 2.1.2.1 incorrectly reference Section 2.1.1.5 for describing the location of supplemental soil borings. Section 2.1.1.5 describes borehole plugging and abandonment. Please revise Sections 2.1.2 and 2.1.2.1 to refer to the correct reference.

2. The unit of measure listed for Benzene in Table 4-1 is incorrect. The correct unit of measurement should be ug/kg. Please revise Table 4-1.

3. The units of measure for Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) listed in Tables 4-2 through 4-27 and Tables 4-29 through 4-54 is incorrect. The correct unit of measurement should be µg/kg. Please revise these tables.

4. The unit of measure for Blood Lead Levels listed in Table 4-28 is incorrect. The correct unit of measurement should be µg/dl as described in the last paragraph of Section 4.4. Please revise this table.

5. MRP stated a desire to conduct a probabilistic risk assessment (PRA) on data obtained from the June 2000 RFI II investigation and the recent Exposure Unit Supplemental Soil Investigation. A PRA is a higher level (Tier II) risk assessment that uses the probability distributions to determine risk instead of

point estimates used in the RFI II and SSI risk assessment. EPA will address the issue of conducting a PRA after MRP responds to the EPA comments that are detailed in this letter.

EPA COMMENTS

General Comment

The first RFI report, which addressed soil, groundwater, surface water, and sediment, was completed in August 1992. "Additional delineation" was included in a Phase II RFI in 1999. Decommissioning has since occurred, which includes removal of soil and structures. Because the older soil data are not representative of current conditions, new soil data were collected as part of this Supplemental Soil Investigation (SSI). Page 5-1 states that this Report describes the conduct of the SSI, provides the data results, and presents risk estimates, however, the "Risk Estimates," presented in Chapter 4 only compare the concentrations of a few metals, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) that were detected in soil (shallow and deep) at the site exposure units with industrial soil screening levels. While this screening level evaluation is useful, we suggest that MRP collect additional data and develop a baseline human health risk assessment in order to accurately characterize current and potential future health risks at the site. As mentioned in the specific comments below, we believe additional data should be collected regarding the presence of site-related constituents such as petroleum hydrocarbons and all of the PAHs. It is important to consider all potential future receptors, including utility workers, construction workers, and indoor workers. It is also important to characterize risks resulting from potential exposure to site-related Contaminants of Potential Concern (COPCs) in all media. This includes examining potential risks from vapor intrusion. Prior to submitting a baseline risk assessment, we recommend developing a work plan, including a conceptual site model and the proposed screening levels, exposure parameters, and toxicity values. Finally, we welcome the opportunity to meet and discuss the below comments, as well as the objectives and timeline for this site.

Specific Comments

1. Section 1.3 (p. 1-3). The first paragraph of this section states that soil cleanup goals have already been established for the site and approved by the EPA, and the second paragraph indicates that they were based on exposure to soil by a commercial/industrial worker. We note that establishment of cleanup goals first requires adequate characterization of potential site risks. Without consideration of potential risks to construction workers via exposure to subsurface soil, we question whether site risks have been adequately characterized. Please identify and examine potential health risks for all possible human receptors (e.g., commercial/industrial workers, utility workers, construction workers, etc.) based on current and potential future use of this site.

2. Section 1.3 (p. 1-3). This section indicates that likely future land use of the site is industrial/commercial. However, since the area to the west of the site is residential, we question whether a portion of the site might become residential in the future, without additional data. The last paragraph on this page states that "parcels sold to individual developers" would be at least 5 acres. EPA is required to assess risks to receptors under both current and potential future land use scenarios (USEP A, 1989). Therefore, please provide adequate justification why future residential use of this site is not expected, including zoning maps and restrictions. As part of the discussion, this might include the location of the CDL outside of the levee.

3. Section 1.3 (p. 1-3). The last paragraph in this section states that, "It is recognized that a worker will only be exposed to a small area within any EU, as individual parcels will largely be paved or covered

with structures, and worker exposure will be confined to the remaining area. These unpaved areas will not be regular work areas in most instances." While this may be true under the current land use, a risk assessment must also assess risks under a Reasonable Maximum Exposure (RME) scenario for potential future land use conditions. Since risks under an RME scenario for future receptors should be assessed assuming removal of pavement and buildings at this site, these sentences should be deleted.

4. Section 1.3 (p. 1-4). The last paragraph in this section indicates that data were re-screened using EPA's Regional Screening Levels from November 2010. Please note that the RSLs are updated approximately biannually. This report should use the most recent version, which currently is November 2011. The next update is expected in the Spring of 2012.

5. Section 1.4 (p. 1-4). The second to last sentence in this section indicates that Section 4 calculates risks for future site workers. Although risk estimates are presented, they do not adequately characterize site risks for all receptors, media, and the COPCs, as previously discussed. We suggest referring to Section 4 as a soil screening level evaluation.

6. Section 2.1.1.1 (pp. 2-1 and 2-2). This section indicates that photo-ionization detector (PID) readings were collected at one foot depth intervals throughout each soil core. Further, "if visual impacts or elevated soil headspace concentrations were observed, then the soil sample was collected from that interval." Please note that Region 7 does not consider PID readings, color, or odor suitable for risk assessment purposes. For example, a PID is a non-specific detector with relatively high detection limits that has to be calibrated to a specific volatile compound. Therefore, it is not entirely certain that samples were collected from the most highly contaminated soil intervals, especially PAHs and metals. Furthermore, the extent of metals and PAH contamination may not mirror the VOC contamination. In order to adequately characterize the vertical profile of contamination and to generate statistically valid exposure point concentrations for use in a human health risk assessment, a sufficient number of samples should be collected from the interval of interest (i.e., a single subsurface sample collected from 3-4 ft bgs may be inadequate for risk assessment purposes) and analyzed using laboratory methods. Please either collect additional data, or use the existing data to show that the contamination has been adequately characterized.

7. Section 2.1.1.3 (p. 2-2). This section, "Soil Sampling Procedures", indicates that surface soil samples were collected from intervals between 0 and 2 ft below ground surface (bgs). However, in human health risk assessment, surface soil is defined as soil from 0 - 2cm bgs. That is because receptors exposed to surface soil, such as an industrial worker, are unlikely to contact soil much deeper. It may be acceptable for MRP to use soil samples collected from 0 - 2 ft bgs to represent surface soil, so long as the concentrations of the COPCs detected reflect what is present in the top 2 cm of soil. If soil samples from 0 - 2 cm bgs are available, MRP should compare the COPCs detected in these samples with concentrations detected at 0 - 2 ft bgs to show that risks would not be underestimated. Otherwise, MRP should discuss how the COPC concentrations compare between 0 - 2 cm bgs and 0 - 2 ft bgs, based on history of spills at the surface, leaks underground, any clean backfill soil, etc. If the site history suggests the COPC concentrations in the upper 2 cm are greater than in the 0 - 2 ft bgs interval, it may be necessary to collect soil samples closer to the surface to adequately characterize potential risks from exposure to surface soil.

8. Section 2.1.1.3 (p. 2-3) and Section 2.1.2 (p. 2-4). These sections indicate that subsurface soil samples were collected from 2 - 4 ft bgs and from 4 - 8 ft bgs in the decommissioned portion of the Process Area.

Unlike surface soil, there is no default depth for subsurface soil that is used in human health risk assessment. Instead, we use our best professional judgment to determine the current and potential future receptors that are likely to contact subsurface soil. This typically includes construction and utility workers. We then look at excavation practices in the area to determine the depth of soil these receptors are likely to contact. Often, this is around 0 - 10 ft bgs. However, p. 2-4 indicates that future construction is likely to be slab-on-grade, limiting the depth of soil to which future workers could contact. MRP should provide clarification in the report as to why they believe future construction will be limited to this depth. For instance, MRP might indicate that this practice reflects historical and current construction practices in the area. They might also indicate that construction is likely to be slab-on-grade due to the proximity of the rivers and potential for flooding.

We note that a single subsurface sample collected from 2 - 4 ft bgs at each sampling location may be inadequate to characterize potential health risks and to delineate the vertical extent of contamination, particularly if leaching is of concern. We do note that deeper samples were collected from 4 - 8 ft bgs in part of the Process Area to examine potential underground pipe leakage. MRP should justify why a single subsurface soil from each location is adequate, or collect additional samples.

9. Table 2-1. We note that the historical and current activities of this site are petroleum refining and asphalt operations; VOCs, PAHs, and Total Petroleum Hydrocarbons (TPH) are associated with these operations. Table 2-1 lists the specific VOCs, PAHs, and metals that were included in the laboratory analyses of the SSI, but the lists are not comprehensive. For instance, the lists of PAHs include only benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Naphthalene is just one example of a PAH that was not included in the analyses. The list of the VOCs includes; BTEX (i.e., benzene, toluene, ethylbenzene, and xylenes), PCE, and TCE, but not *cis*- or *trans*-l,2-dichloroethylene or vinyl chloride. Samples were only analyzed for up to three metals: arsenic, chromium, and lead (CDL area only). Finally, samples were not analyzed for the various aliphatic and aromatic hydrocarbon fractions, or even TPH. Since VOCs, P AHs, and TPH are known to be associated with petroleum refining and asphalt operations, their exclusion may lead to underestimated potential human health risks. Please include adequate data to characterize potential exposure to all VOCs and PAHs, as well as to petroleum hydrocarbons (see Comment 10), related to this site.

10. Total Petroleum Hydrocarbons. A document called, "Provisional Peer-Reviewed Toxicity Values for Complex Mixtures of Aliphatic and Aromatic Hydrocarbons", can be found at: http://hhpprtv.ornl.gov/issue_papers/ComplexMixturesofAliphaticandAromaticHydrocarbons.pdf. It describes the fraction-based approach used to assess potential risks from hydrocarbon mixtures. In brief, this document provides toxicity values for low, medium, and high molecular weight aromatic and aliphatic fractions. Based on MRP's knowledge of the types of petroleum hydrocarbons handled on their site, MRP should identify which aromatic and/or aliphatic fractions may be present. MRP should then collect samples and analyze for these fractions. Then, using the surrogate toxicity values recommended in this document, MRP should evaluate potential risks from each of the fractions. Because evaluation of hydrocarbon mixtures is not straight-forward, we recommend that MRP obtain EPA concurrence on their planned approach prior to collecting data.

11. Section 2.1.1.6 (p. 2-4). This section indicates that soil samples collected from the Construction Debris Landfill (CDL) Area were analyzed for lead, but those collected from the Process Area, Junk Storage Area, and Supplemental Soil Borings were not. Please provide a rationale why soil samples from these areas were not analyzed for lead.

12. Section 2.1.2 (p. 2-4). This section introduces the concept of exposure units. We note that, for human health risk assessment, we assume an exposure unit represents the areas for which a receptor is equally likely to contact, based on activity patterns. Since activity patterns are different for different types of receptors, the boundaries of exposure units may differ for each receptor. For example, an outdoor maintenance worker might be exposed to most of the site, an industrial/commercial worker would be exposed to a portion of the site, and a construction or utility worker would likely be confirmed to a small area. Exposure units also typically consider the historical use of a site. We recommend that MRP include more details in the risk assessment describing how the exposure units were defined and why they are representative of the various receptors.

13. Section 2.1.2.5 (p. 2-7) and Section 4.2 (pp. 4-3 and 4-4). Section 2.1.2.5 describes the collection of samples to evaluate the background concentration of arsenic in area soils. Section 4.2 discusses the concentrations of arsenic detected in these samples. We suggest also referring to USEPA (2002) for guidance regarding use of background data.

14. Tables 3-1 through 3-15. These tables compare the concentrations of metals, the VOCs, and the PAHs detected in soil samples collected at the site, including both historical data and the latest sampling event. The concentrations were compared to two sets of screening levels. The EPA's industrial soil screening level for each compound was selected from the lower of 1) a cancer screening level based on a 1 x 1 0-6 excess risk or 2) a non-cancer screening level based on a hazard quotient of 1.0. The Kansas tier 2 non-residential RSL for each compound was based on the lower of 1) the non-residential soil pathway or 2) the soil to groundwater pathway.

    For screening purposes, Region 7 uses non-cancer screening levels based on a hazard quotient of 0.1, rather than 1, to account for potential additive health effects. Please ensure that the EPA RSLs included in Tables 3-1 through 3-15 are adjusted to reflect a non-cancer hazard quotient of 0.1. Additionally, please be sure to use the most current version of the EPA's RSLs, as mentioned in Comment 4.

    We are uncertain why Kansas RSKs based on the soil-to-groundwater pathway were used in Tables 3-1 through 3-15, but the EPA's analogous RSLs for the protection of groundwater were not. If leaching is a concern, this highlights the need to fully characterize the extent of soil contamination, as well as potential health risks associated with exposure to the COPCs in groundwater, surface water, sediment, and indoor air.

    Finally, we note that a toxic equivalency (TEQ) approach was used to represent the total toxicity of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracence, and indeno(1,2,3-cd)pyrene in terms of benzo(a)pyrene. However, when this PAH TEQ concentration was reported in Tables 3-1 through 3-15, the screening level was reported as N/A. If a TEQ approach is used to represent toxicity in terms of benzo(a)pyrene, then the appropriate screening level is that of benzo(a)pyrene. We recommend that MRP compare each PAH to its specific RSL. However, note that because PAHs are site-related constituents, the RSLs may not be used to "screen out" any of the PAHs.

15. Section 3.1 (p. 3-1). The fourth paragraph in Section 3.1 states that the risk estimates only address direct contact with soil because "the groundwater interception and hydrocarbon recovery system has controlled the migration of constituents in groundwater." Please evaluate potential risks to current and potential future receptors at the site based on exposure to the COPCs in surface and subsurface soil, groundwater, surface water, sediments (if applicable), and indoor air (under future conditions).

16. Section 3.1 (p. 3-2). The first complete paragraph on page 3-2 discusses the PAH TEQ approach mentioned in Comment 14. This page indicates that the objective of this approach is to assess the spatial distribution. While this seems a valid approach, we note that only 6 of the PAHs are represented. Although some of the other PAHs do not have toxic equivalence factors (TEFs) in terms of the carcinogenicity of benzo(a)pyrene, there are a number of PAHs not included on page 3-2 that do. If MRP wishes to use this approach, they should collect and use data on all the PAHs, in order to not be misleading. Finally, note that the correctly calculated total PAH TEQ should be compared to the EPA's screening level for benzo(a)pyrene of 210 µg/kg, in addition to the Kansas RSK of 3,380 µg/kg.

17. Section 4.0. (p. 4-1). This page indicates that it was considered appropriate to review the SSI data to determine whether any other constituents (besides the 9 COPCs listed on page 4-1) could be potentially associated with significant health risks and add these constituents to the COPCs list. As has been discussed, a human health risk assessment for this site must examine potential risks based on current and potential future exposures to site-related contaminants. Based on the history of this site, please include petroleum hydrocarbons and all of the PAHs as the COPCs. Without addressing potential exposure to these constituents, we believe the risks presented in Section 4 are greatly underestimated, which means that additional areas besides those identified in this report may not be protective of human health.

18. Table 4-1. This table compares maximum detected concentrations of the analytes to the EPA's RSLs.
    a. The correct industrial soil cancer RSL for benzene is 5,400 µg/kg, rather than 5,400 mg/kg.
    b. The correct industrial soil cancer RSL for chloroform is 1,500 µg/kg, rather than "NV" (No value). Because the maximum detected concentration (2,000 µg/kg) exceeds this screening level, please retain chloroform as a COPC.
    c. The correct industrial soil cancer RSL for ethylbenzene is 27,000 µg/kg, rather than "NV" (No value).
    d. The correct industrial soil cancer RSL for tetrachloroethene should be 110,000 µg/kg instead of 2,600 µg/kg. The correct non-cancer RSL should be 41,000 µg/kg, instead of 2,300,000 µg/kg. These changes are because IRIS published new toxicity values for PCE in February 2012.
    e. The correct industrial soil cancer RSL for trichloroethene should be 6,400 µg/kg instead of 14,000 µg/kg. The correct non-cancer RSL should be 2,000 ug/kg, instead of "NV". These changes are because IRIS published new toxicity values for TCE in September 2011.

19. Section 4.1 (p. 4-2) and Section 4.4.2 (pp. 4-11 and 4-12). The last paragraph in the section, "Selection of COPCs," indicates that the carcinogenic RSLs were not used for chloroform and ethylbenzene because "EPA does not consider these compounds to be a carcinogenic concern." Page 4-11 states, "The use of carcinogenic RSLs would have been inconsistent with the Integrated Risk Information System (IRIS) database ... " USEPA (2003) indicates the hierarchy that the EPA follows regarding the selection and use of toxicity values in human health risk assessments. The appropriate carcinogenic RSLs for chloroform and ethylbenzene are provided in Comments 18b and 18c, respectively.

20. Section 4.3 (p. 4-4). The fourth paragraph in this section, "Exposure Point Concentrations," states that one-half the reporting limit was used for non-detect results when calculating the mean concentrations. Please note that ProUCL version 4.00.05, which was used in this report; can use statistical methods to calculate EPCs for datasets with non-detect observations. Thus, please use these capabilities to generate statistics, and do not substitute one-half the reporting limit when calculating EPCs, means, and/or other values.

21. Section 4.4 (p. 4-5). This section, "Risk Estimates," indicates that, with the exception of lead, risk estimates were derived by dividing the EPCs for each COPC in each exposure unit by their respective cancer and non-cancer industrial soil RSLs. The individual cancer and non-cancer risks for all of the COPCs in a given exposure unit were then added together to provide screening level estimates of cancer and non-cancer risks, respectively. While these screening level evaluations are useful, they do not consider, all possible current and future exposure scenarios at this site (e.g., construction or utility workers), nor do they include exposure to multiple media (e.g., soil, groundwater, sediment, and air). We recommend developing a baseline risk assessment to evaluate cancer and non-cancer risks to current and potential future receptors, based on their exposure to the COPCs in all media.

22. Table 4-28. In this table, "Summary of Risk Estimates," we note that a blood lead level in mg/dL is provided for each exposure unit. Instead, please report the probability that an exposed worker (i.e., a woman of child-bearing age) will have a blood lead level that exceeds 10 µg/dL for each exposure unit. (Please be sure to discuss blood lead levels in terms of µg/dL, rather than mg/dL.) Potential risks from exposure to lead at each exposure unit at this site are acceptable if there is no greater than a 5% chance of exceeding a blood lead level of 10 µg/dL.

23. Section 4.4.1 (pp. 4-6 through 4-9). This section summarizes the cancer and non-cancer risk estimates derived in this document. Because these risk estimates are only applicable for industrial/commercial exposure to a limited set of COPCs in soil, we do not believe they adequately characterize potential health risks at this site. Please re-evaluate risks in a more comprehensive human health risk assessment, which addresses the comments in this memo.

24. Data Evaluation. Please include a discussion of whether the data is adequate for risk assessment purposes. This includes comparing whether detection/reporting limits were adequate. Guidance can be found in USEPA (1992).

References

U.S. EPA. 1992. *Guidance for Data Useability in Risk Assessment (Part A).* Office of Emergency and Remedial Response, Washington, D.C. 9285.7-09A.

U.S. EPA. 2002. *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites.* Office of Emergency and Remedial Response, Washington D.C. OSWER 9285.7-41. http://www.epa.gov/oswer/riskassessment/pdf/background.pdf

U.S. EPA. 2003. *Human Health Toxicity Values in Superfund Risk Assessments.* OSWER Directive 9285.7-53. Office of Superfund Remediation and Technology Innovation, Washington, D.C.

Kelly Schumacher who is the EPA risk assessor that reviewed the SSI report has contacted me and has offered to discuss any questions that MRP may have with the above comments. KDHE relies on the expertise of EPA to evaluate risk assessments thus a telephone conference between EPA, MRP, and KDHE may be necessary to discuss any issues that MRP has with EPA's comments. Please contact me if you wish KDHE to setup a phone conference with the EPA risk assessor to discuss the risk assessment review. In addition, I will be contacting you shortly to schedule a face to face meeting between MRP, MWH, EPA, and KDHE to discuss results of the SSI investigation, the permit, and future investigation at the facility. Please submit your written response to comments to KDHE by April 6, 2012 and copy EPA. If you have any questions, please contact me by phone at (785)-291-3760 or e-mail me at (mvishnefske@kdheks.gov).

Sincerely,

Mark Vishnefske

Mark Vishnefske
Environmental Scientist II
Hazardous Waste Corrective Actions

cc: Jay Mednick – MWH
Brad Roberts – EPA Region VII - AWMD/RCAP
Allison Herring – DEA/SCDO/Waste Programs
Bill Bider – BWM